Teacher-reported effects of the Playing-2-gether intervention on child externalizing problem behaviour

Abstract

This longitudinal study examines the teacher-perceived effect of a school-based intervention (i.e., Playing-2-gether) targeting teacher-child interactions to reduce externalizing problem behaviour amongst preschoolers. Boys with the highest score for externalizing problem behaviour in the classroom and their teacher participated in the study. Teacher-child dyads (*N*=175) from 46 schools were randomly assigned to an intervention or a control (i.e., education as usual) condition. Teacher-rated questionnaires were collected before, during, and after the implementation of the intervention. The results of latent growth modeling indicated that intervention boys, compared with control boys, showed a larger decrease of externalizing problem behaviour.

Key words: externalizing problem behaviour, teacher-child interactions, intervention, preschool

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Externalizing problem behaviour (EPB) in early childhood refers to a range of behaviours that are disruptive and/or harmful for others (such as being disobedient, hurting other children, taking things away from children; e.g., Smidts & Oosterlaan, 2005, 2007). This pattern of behaviour has repeatedly been shown to be an important risk factor for maladjustment in several domains later in life, such as delinquency, school failure, and mental disorders (e.g., Dodge, Coie, & Lynam, 2006). Nevertheless, EPB seems to be a dynamic entity during early childhood, as it is responsive to environmental efforts that may act as a buffer against the exacerbation of this behaviour (e.g., Buyse, Verschueren, & Doumen, 2011). To prevent EPB, it is important to understand - and be able to manipulate - the environmental factors that influence the development of EPB amongst young children.

In recent years, next to parent-child and peer interactions, teacher-child interactions are increasingly considered as environmental factors shaping children's behaviour and development (Pianta, Hamre, & Stuhlman, 2003). With regard to EPB, both the affective parts of teacher-child interactions and adequate behavioural management by teachers have been shown to act as preventive factors against this behaviour (e.g., Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008; Leflot, van Lier, Onghena, & Colpin, 2010). Nevertheless, intervention studies are scarce, and specifically interventions that combine both parts to influence child EPB frequently suffer from methodological limitations, such as a lack of a control group (e.g., Filcheck, McNeil, Greco, & Bernard, 2004) and a small number of participating classes or children (e.g., Filcheck et al., 2004; Lyon et al., 2009; McIntosh, Rizza, & Bliss, 2000; Tiano & McNeil, 2006).

The goal of the present study was to fill this gap by investigating the effects of a theory-based intervention developed for teachers of young children showing EPB. Setting up

a randomized controlled trial with a sufficient number of participants would allow us to draw more stringent conclusions than previous studies were able to (cf. Flay et al., 2005).

The Role of Teacher-Child Interactions in the Course and Malleability of Externalizing Problem Behaviour Amongst Preschoolers

To date, attachment theory (e.g., Pianta et al., 2003) and learning theory (e.g., Cowan & Sheridan, 2009) are two major theoretical frameworks that shed light on the links between teacher-child interactions and child EPB.

According to attachment theory, developing a secure attachment bond with the primary caregivers is important to promote development and to prevent adjustment problems in general and EPB in particular (see meta-analysis by Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsey, & Roisman, 2010). As teachers can be considered as temporary or ad hoc attachment figures playing the role of secure base and safe haven, especially for young and/or vulnerable children (e.g., Ainsworth, 1991; Koomen, Verschueren, & Thijs, 2006; Verschueren & Koomen, 2012), their relationships and interactions with children can impact the adjustment of these children. For example, several longitudinal studies have indicated that the risk of developing or maintaining EPB decreases if children form close relationships with their teachers (e.g., Meehan, Hughes, & Cavell, 2003; O'Connor, Dearing, & Collins, 2011). As such, close teacher-child relationships are considered important resources to draw 'capital' from if behaviour problems arise in the classroom (e.g., Driscoll & Pianta, 2010). Children's experience of the teacher as sensitive to their needs may help them to regulate their behaviour, e.g., maintain adequate behaviour or redirect disruptive behaviour in times of stress in the classroom (e.g., Driscoll & Pianta, 2010). To convey sensitivity to the child, it is important that teachers observe, describe, and label feelings of children correctly (e.g., Driscoll & Pianta, 2010; Pianta & Hamre, 2001).

Also learning theory stresses the importance of teacher-child interactions in the development of child EPB. Operant conditioning, for example, makes use of consequences as a means of behavioural change (Cowan & Sheridan, 2009; Hermans, Eelen, & Orlemans, 2007). Next to consequences, antecedents of behaviour are important (cf. ABC-model, see Hermans et al., 2007; Applied Behaviour Analysis, see Cowan & Sheridan, 2009). By setting up the conditions under which the desired behaviour is likely to occur (i.e., antecedent manipulation) and by reinforcing the behaviour if it occurs (i.e., consequence manipulation), the incidence of desired behaviour can be enhanced. Alternatively, punishment can be used to reduce undesirable behaviour (Cowan & Sheridan, 2009). In the parent-child interaction literature, several interventions based on operant conditioning principles and the ABC-model have been found to be effective in decreasing child EPB (e.g., Dishion et al., 2008; Furlong et al., 2012; Kazdin, 1997). Similarly, in the teacher-child interaction literature, adequate behaviour management techniques in the school context, including stating clear rules and consistently using praise and other rewards, have been shown to reinforce children's appropriate behaviour and to reduce child EPB (e.g., Cowan & Sheridan, 2009), especially for children at a higher risk of EPB (e.g., Wilson & Lipsey, 2007; Wilson, Lipsey, & Derzon, 2003). In contrast, inadequate behaviour management techniques such as harsh corrections have been linked to more child EPB (e.g., Leflot et al., 2010).

In sum, attachment theory and learning theory underscore the importance of teacher-child interactions for the development of child EPB, the first focusing on the role of affective and dyadic components of teacher-child interactions, the second on behavioural management strategies of teachers in their interactions with students. The abovementioned theories and research evidence also show that teachers may play an intervening role in changing the behavioural development of children with EPB (e.g., O'Connor et al., 2011). Moreover, they point to the added value of developing interventions focused on changing teacher-child

interactions in an attempt to prevent children from developing or maintaining high levels of EPB (e.g., Hughes, Cavell, & Jackson, 1999; O'Connor et al., 2011; Pianta, 1999; Pianta & Hamre, 2001).

Interventions Targeting Teacher-Child Interactions

In the domain of parent-child interactions, several interventions have been developed that combine an attachment and a learning theory perspective and for which the evidence-base is extensive (e.g., Herschell, Calzada, Eyberg, & McNeil, 2002; Van Zeijl et al., 2006). As opposed to parent-child interventions, however, few school-based interventions have explicitly had the purpose of improving/altering teacher-child interactions from a (combined) attachment and a learning perspective. A notable exception is Teacher-Child Interaction Therapy (TCIT; McIntosh et al., 2000). Teacher-Child Interaction Therapy (TCIT) consists of a first part aimed at developing or enhancing positive interactions between teacher and child, based on attachment theory (Child-Directed Interaction, CDI) and a second part aimed at improving the teacher's behavioural management, based on learning theory (Teacher-Directed Interaction, TDI) (McIntosh et al., 2000). Both intervention parts continue for six weeks. A number of studies suggest positive effects of TCIT in decreasing child EPB (Filcheck et al., 2004; Lyon et al., 2009; McIntosh et al., 2000; Tiano & McNeil, 2006). However, these studies are small-scaled and do not use a randomized controlled design.

Building on the results of these studies and on the theoretical frameworks described above (Cowan & Sheridan, 2009; Pianta et al., 2003), an indicated intervention, Playing-2-gether (Vancraeyveldt, Van Craeyevelt, Verschueren, & Colpin, 2010) , was developed for preschoolers showing EPB and their teachers.

Similar to TCIT (McIntosh et al., 2000), Playing-2-gether consists of two 6-week parts. The first part is based on attachment theory and aims at improving the affective quality of teacher-child interactions. It is expected that this part will result in improved teacher-child

communication, increased positive emotional experiences and motivation to change within the child that - in turn - may facilitate the effectiveness of behaviour management techniques (cf. Barkley, 1987, in Driscoll & Pianta, 2010). These behaviour management techniques are further elaborated in the second part of Playing-2-gether, which is based on learning theory (see Method section for a more detailed description of Playing-2-gether). In the present study, we investigated the effect of Playing-2-gether on teacher-reported child EPB.

Teacher Reports as a Means to Evaluate the Effect of School-Based Interventions on Preschoolers' Externalizing Problem Behaviour

In school mental health research, a difficult design challenge is that teachers are often in the best role to provide the intervention and assess the participants, especially for preschoolers. This may raise some concerns, as there is a risk that teachers who received the intervention may be more inclined to report positive outcomes for children, simply because they were receiving the intervention (e.g., Fernald, Coombs, DeAlleaume, West, & Parnes, 2012; Hamre, Pianta, Mashburn, & Downer, 2012). Moreover, teacher reports are likely to reflect both real changes in children's functioning as well as teachers' views of children (Konold & Pianta, 2007; Mashburn, Hamre, Downer, & Pianta, 2007). As such, a change in teacher reports of EPB does not necessarily mean a change in actual behaviour of the child (e.g., Hamre et al., 2012).

On the other hand, teacher reports have been shown to have several advantages above and beyond other assessment methods of EPB in (intervention) research for preschoolers. First, as intervention research is generally time-consuming, teacher reports are considered easily administrable instruments that may give researchers a first indication of an intervention effect. Second, teachers' reports of EPB have been found to be reliable and valid (e.g., Konold & Pianta, 2007; Spilt, Koomen, Stoel, Thijs, & van der Leij, 2011). For example, Leflot, van Lier, Verschueren, Onghena, and Colpin (2011) found a relatively high correlation

between teacher reports and peer nominations of behaviour. Moreover, observational studies show that teacher reports of EPB relate at least to some extent to actual EPB in a specific context (e.g., McEvoy, Estrem, Rodriguez, & Olson, 2003; Ostrov & Keating, 2004; Spilt et al., 2011). Third, teacher reports seem to be the logical choice for evaluation of preschoolers' behaviour in the school context, considering preschoolers' difficulties with providing self-reports and peer ratings (e.g., Carter, Briggs-Gowan, & Davis, 2004). Observations in the classroom on the other hand frequently only sample short time intervals (e.g., Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012; Ladd & Profilet, 1996; Lakes & Hoyt, 2008), whereas teachers' judgments of EPB are rooted in many daily observations and interactions with children across various situations in the school context (e.g., Spilt et al., 2011). Finally, teacher reports have been found to be predictive of school-related outcomes (e.g., behavioural engagement, school trajectories), above and beyond objective test results or observations (e.g., Doumen et al., 2012; Pianta, Steinberg, & Rollins, 1995). Moreover, school referrals for EPB are often initiated by adults, typically teachers, which stresses the importance of obtaining information from the teacher's perspective (e.g., Kim, Kim, & Kamphaus, 2010). As teachers' subjective views are important determinants of teacher-child interactions in the classroom (Dobbs & Arnold, 2009), which, in turn, have been linked to (observed) child EPB (e.g., Doumen et al., 2008, Doumen et al., 2009; Silver, Measelle, Armstrong, & Essex, 2005), it seems necessary to obtain information from the teacher's perspective, also in intervention research.

This Study

The main objective of the present study is to investigate the effect of the Playing-2-gether program on teacher-rated child EPB. By using a longitudinal randomized controlled trial (RCT), we aim to study the effect of the intervention on the growth trajectories of young children's EPB, drawing more firm conclusions than similar small-scaled studies were able to

(e.g., Filcheck et al., 2004; Flay et al., 2005). Hence, we will test the following hypothesis: Playing-2-gether is more effective to decrease child EPB than no intervention ('education as usual'). 'Education as usual' means that neither teachers nor children receive a special intervention. In that case, teachers continue to work with their students as always.

Method

Participants

In the school year 2009-2010, 46 schools were recruited (see flowchart, Figure 1). Schools were located in urban areas in the Flemish region of Belgium (Statistics Belgium, 2012). In Belgium, preschool education is available for children aged 2.5 to 6 years. Children between the ages of 2.5 and 3 are mostly taught in a separate class (a sort of pre-preschool class). The first, second, and third preschool group respectively consist of children aged between 3 and 4 years, between 4 and 5 years, and between 5 and 6 years.

Parental consent for participation in a screening procedure was requested for 3747 children of the first and second preschool group and obtained for 3613 children (96.4%). If parental consent was given, teachers completed a behaviour checklist (i.e., the Externalizing Scale of the Preschool Behaviour Questionnaire, see Measures). Next, the male preschooler with the highest score was selected from each class. We exclusively targeted boys, as boys tend to be more responsive to the effect of early teacher-child interactions than girls (e.g., Hamre & Pianta, 2001). In addition, boys generally show higher levels of EPB than girls (e.g., Dishion, French, & Patterson, 1995; Hagekull & Hammarberg, 2004; Rutter, Caspi, & Moffitt, 2003).

All 46 participating schools had three or four classes of the first and second preschool group, resulting in 175 participating classrooms. In each classroom, parental consent to participate in the intervention study was requested for the selected male preschooler. If the boy with the highest score on the screening questionnaire was not able to participate, the boy

with the second highest score was selected, and so on. Reasons for not being able to participate were parental refusal (41 children), being absent from school for a long period (2 children), being enrolled in a similar intervention for behavioural or emotional problems at the time of the screening or not meeting the inclusion criteria of the Playing-2-gether intervention (5 children). More specifically, children with a diagnosis of autism spectrum disorder or children with a suspicion of autism spectrum disorder as judged by the child's teacher and/or parent(s) were not included in this study because research on the precursors of Playing-2-gether suggests that these children may be less likely to benefit from this type of intervention (e.g., Hembree-Kigin & McNeil, 1995).

In the school year 2010-2011, the selected children (N = 175) participated in the intervention study, together with their new teacher. Per class, only one teacher-child dyad participated, to ensure feasibility of intervention implementation and data collection. The children's age ranged from 3 years and 9 months to 5 years and 9 months, with an average of 4 years and 9 months (SD = 7 months). The majority of the children (91.4%) had the Belgian nationality. The other children had the Dutch (0.6%), Spanish (0.6%), or Turkish nationality (0.6%), or two non-Belgian nationalities (1.1%). For 5.7% children, the nationality was unknown. Most children (70.9%) had Dutch (i.e., the official language in Flanders) as their language of origin, 9.7% children spoke Dutch and another language at home, and 17.1% children only spoke another language at home. The language of 2.3% children at home was unknown.

The majority of the children's parents (84% mothers, 85.7% fathers) had the Belgian nationality. Less than half of the parents had completed higher education (45.1% mothers, 38.9% fathers). The remaining parents had finished senior high school (35.4% mothers, 34.9% fathers), junior high school (14.3% mothers, 18.2% fathers), or primary school (2.9%

mothers, 4.0% fathers). Educational level was unknown for four mothers (2.3%) and seven fathers (4.0%).

The children's teachers (N = 175, 98.3% female) were also involved in the study. Per class, one teacher participated in the study with one child. Most of the classes (81.3%) had one full-time teacher, and 18.7% of the classes had two part-time teachers. Of these part-time teachers, only the teacher who spent the most time in the classroom participated in the study with the selected child. Due to illness or pregnancy of the teacher, 13 teachers were replaced during the course of the study. The fill-in teachers participated further with the selected children in the study. All teachers spoke Dutch in the classroom.

At the end of the school year 2010-2011, 166 (94.9%) children still participated in the study. Drop-out was due to school changes (three children), long-term absence of the child (for example due to illness, two children) or withdrawal from participation by the teacher (four children). Drop-out was not significantly associated with any of the study variables, such as intervention status, preschool group (i.e., second versus third preschool group), or initial EPB.

---- Insert Figure 1 about here ----

Design and Procedures

A randomized design was used with the teacher-child dyad as unit of randomization. At the beginning of the school year 2010-2011, 175 teacher-child dyads in 46 schools (with three or four participating classes per school) were randomly assigned per school and preschool group (second or third) to an intervention or a control condition, based on an arbitrary criterion (i.e., alphabetic ordering of the second letter of the first name of the participating teacher). As a result, 89 teacher-child dyads were assigned to the Playing-2-gether condition and 86 teacher-child dyads to the control condition. No significant

differences were found between intervention and control group in preschool group (second or third), and initial child EPB.

Data collection took place in the intervention and control classes at three time points. The first data wave consisted of a pre-test measurement (Wave 1, October - December 2010), followed by the implementation of the first six-week part of Playing-2-gether in the intervention condition. During the implementation of this first intervention part in the intervention classes, the control children received education as usual. Afterwards, an intermediate assessment took place (Wave 2, December 2010 - March 2011), followed by the second six-week part of Playing-2-gether. Once again, the control children received education as usual. Next, there was a post-test measurement (Wave 3, February - May 2011).

Data were collected using a teacher questionnaire which was sent to the teachers, and assembled after a few weeks. The response rate for the teacher questionnaire at Wave 1, 2, and 3 was 98.9%, 94.3%, and 87.4% respectively.

The Playing-2-gether intervention

The Playing-2-gether intervention is developed for preschoolers with (a relatively high level of) EPB and their teachers. Through targeting teachers' interactions with the children, the program aims at decreasing child EPB. To obtain that goal, Playing-2-gether consists of two 6-week parts during which the teacher organizes play sessions with the target child on a regular base. Each play session takes place minimum two times a week, with a duration of approximately 15 minutes per session.

Rooted in attachment theory (Pianta et al., 2003) and being an adapted version of Banking Time (Pianta & Hamre, 2001), the first part of Playing-2-gether - Relationship-Game - is aimed at improving the teacher-child relationship. It should be noted that the name 'Banking Time' was changed to 'Relationship-Game', because of the (small) changes in the program that were made to suit the Flemish school context. During the play sessions in

Relationship-Game, the activity is chosen by the child, and the teacher's behaviour is constrained to describing the child's activity and conveying understanding. Several techniques may help the teacher with this task. In short, by observing the child during the game, following his lead (e.g., by imitating his game), narrating his actions and labeling his feelings, the teacher conveys acceptance to the child. Once the teacher feels comfortable with these basic techniques, he or she can also take the relational needs of the child into account and let them guide his/her actions (cf. 'developing relational themes' in Banking Time; Pianta, 1999; Pianta & Hamre, 2001). All the skills mentioned above may change teacher-child interactions and make them become more child-centered instead of teacher-centered (Driscoll & Pianta, 2010; Driscoll, Wang, Mashburn, & Pianta, 2010).

The second 6-week part of Playing-2-gether - Rule-Game - is an integration of the principles of the second part of Teacher-Child Interaction Therapy (McIntosh et al., 2000) with behavioural modification techniques that are grounded in learning theory (Cowan & Sheridan, 2009; Hermans et al., 2007). In contrast to the first part of Playing-2-gether, the session is led by the teacher whom is taught to use skills to increase appropriate child behaviour and reduce EPB (e.g., giving clear commands, introducing rules and a pictogram for the child, praising the child following good behaviour). In line with learning theory (Cowan & Sheridan, 2009), rules are introduced with a pictogram to ensure clarity of the expected behaviour for the child. If EPB still occurs, the teacher may make use of a time-out (following principles set out by Cowan and Sheridan, 2009; Hembree-Kigin and McNeil, 1995). If time-out occurs, it is important that the atmosphere remains positive during the sessions, even if the teacher takes the lead. In both parts of Playing-2-gether, the generalization of the teacher skills to the class context is encouraged.

In this study, the teachers of the intervention condition implemented Playing-2-gether according to a standardized teacher manual developed specifically for this intervention by the

researchers (Vancraeyveldt, Van Craeyevelt, et al., 2010). Moreover, the participating teachers were trained and supervised face-to-face on four occasions by Playing-2-gether consultants. These consultants were either school psychologists or Master's students in school psychology (final year). To ensure consultation quality, the consultants were given a consultant manual developed by the researchers, including a DVD with several good/bad practice examples of the Playing-2-gether skills (Vancraeyveldt, Veyt, Van Craeyevelt, Verschueren, & Colpin, 2010). Moreover, they also received seven two-hour sessions of training and supervision by the consultant-coordinator. The consultants were not involved in the data collection in order to maximize independency of data collection (cf. Flay et al., 2005).

At the start of each of the two intervention parts, the Playing-2-gether consultant provided the teacher training. These training sessions were designed to (a) introduce the teacher to the main Playing-2-gether skills (e.g., by showing them the Playing-2-gether DVD with good/bad practice examples), (b) help solve practical problems (e.g., finding a teacher or a teacher assistant who could supervise the remainder of the children during the implementation of Playing-2-gether with the target child, finding a location and a time to implement Playing-2-gether sessions during the school day), and (c) inspire teachers to employ the Playing-2-gether skills in the sessions and in the classroom. In the fourth week of each of the program parts, a two-hour consultation took place, including a (recorded) observation of a Playing-2-gether session, followed by a video-feedback session with the teacher. We incorporated this out-of-classroom consultation and performance feedback, because research has shown that these strategies may improve the outcomes of school-based interventions beyond those achieved through instructional workshops (e.g., Domitrovich et al., 2008; Gorman-Smith, 2003).

To measure the dosage of implementation, teachers in the intervention group were asked to complete a diary in which they planned and evaluated each Playing-2-gether session. Based on this diary, we calculated the number of Playing-2-gether sessions that took place, and used this as a measurement of dosage (theoretical range score for dosage: 0 to 24 sessions). The mean number of completed Playing-2-gether sessions was 19.08 (80%, *SD* = 4.06), which is considered more than sufficient, as positive results of interventions have often been attained with implementation levels around 60% (Durlak & DuPre, 2008).

Measures

Externalizing problem behaviour (EPB) was assessed with an adapted version of the Preschool Behaviour Questionnaire (Behar, 1977; Dutch translation by Goossens, Dekker, Bruinsma, & de Ruyter, 2000, adapted by Thijs, Koomen, de Jong, van der Leij, & van Leeuwen, 2004), which contains age-appropriate descriptions of behaviour problems in young children. The teachers rated children's behaviour on a 4-point Likert scale ranging from 1 (Absolutely not characteristic) to 4 (Very characteristic). The Externalizing scale of this instrument (14 items) measures several indicators of child EPB, such as being a busy child, being stubborn, and being disobedient. High internal consistency ($\alpha \geq .91$), interrater agreement (r = .91), and high test-retest stability ($r \geq .84$) have been found for this scale in community and clinical samples. Concurrent and predictive validity have been shown (Goossens et al., 2000; Goossens, Bokhorst, Bruinsma, & Van Boxtel, 2002). Moreover, the scale has been shown to discriminate between a clinical and a community sample (Goossens et al., 2000). In our study, the internal consistency (Cronbach's α) of the scale ranged between .86 to .90 across the three data waves.

Family and teacher background were assessed using a parent and a teacher questionnaire respectively. Intervention status was dummy coded (0 = control group, 1 = intervention group).

Results

Descriptive Statistics

The means and standard deviations of child EPB in the intervention and control condition are reported in Table 1. High stability over time was found for child EPB. After the first intervention part (i.e., Wave 2), a significant effect on EPB was found. Moreover, after the intervention as a whole (i.e., at Wave 3), intervention children had a significantly lower mean level of EPB in comparison to the control children.

---- Insert Table 1 about here ----

Playing-2-gether and the Development of EPB

We tested for Playing-2-gether effects on EPB using latent growth modeling in Mplus 6 (Muthén & Muthén, 1998-2012). A growth model with an intercept and a linear slope was specified. Model fit was determined through the Model Chi-Square (χ^2 should be as small as possible), the Comparative Fit Index (CFI; cutoff value close to .95), the Tucker-Lewis index (TLI; cutoff value close to .95), the Root-Mean-Square Error of Approximation (RMSEA; cutoff value close to .06), and the Standardized Root Mean Squared Residual (SRMR; cutoff value close to .08; Hu & Bentler, 1998, 1999; Kline, 2011).

Controlling for clustering at school level was not necessary for our data, because of the very small intra class correlation (ICC = .004) and the very small design effect for EPB at the school level (1.01), which is far below the critical value of 2 (Muthén, 1994; Muthén & Satorra, 1995). This indicates that very little variance in EPB was situated at the school level and that the standard errors were not biased due to dependencies among children in the same school. Overall, 6.8% of the data were missing for the 175 participants that were included in our analyses. Participants with and without missings were compared using Little's (1988) Missing Completely At Random (MCAR) test. This resulted in a normed χ^2 (χ^2/df) of 1.54, which indicates a good fit between sample scores with and without imputation according to

Bollen (1989). Therefore, we used the Full Information Maximum Likelihood (FIML) procedure in Mplus 6 which enables us to maximize the data that are present without replacing any missing values (Allison, 2003; Schafer & Graham, 2002).

First, we parameterized the intercept of EPB at the first assessment of this variable (i.e., Wave 1). Model fit was excellent for the data (χ^2 (2) = .84, p = .66, CFI = 1.00, TLI = 1.01, RMSEA = .00, SRMR = .01). We found a significant decrease in EPB for the whole sample (B_{slope} = -.08, SE = .02, β_{slope} = -.40, p < .001), although there were significant interindividual differences in this mean slope (estimated variance = 0.04, p < .001). An average drop in EPB of 0.08 points comes down to a drop of 0.16 points at Wave 3. This decline is the equivalent of a drop of 32% of a standard deviation in EPB at Wave 3. Next, to test for possible differences in EPB before implementation of Playing-2-gether, we regressed the intercept on the dummy coded intervention status variable. In line with the random assignment, no significant differences were found in initial EPB between the intervention and control condition.

Second, we parameterized the intercept of EPB at the last assessment of this variable (i.e., at Wave 3). In this way, the intercept represented the outcome estimate of EPB after the intervention. Additionally, we regressed the intercept and the slope on the dummy coded intervention status variable to test for differences in the growth and the outcome level of EPB between intervention and control children. In addition to relying on significant test values, we also computed effect sizes, dividing the parameter estimates (multiplied by time) by the pre-treatment standard deviation (Feingold, 2009). The interpretation of these effect sizes is similar to the interpretation of Cohen's *d* (Cohen, 1992; Feingold, 2009). The growth model of EPB with intervention status provided an excellent fit for the data (χ^2 (3) = 2.24, p = .52, CFI = 1.00, TLI = 1.01, RMSEA = .00, SRMR = .01). A non-significant negative estimate of the slope parameter - reflecting the development in EPB over time - indicated that children

who did not receive Playing-2-gether showed a non-significant decrease in EPB from Wave 1 to Wave 3 (B_{slope} = -.04, SE = .02, β_{slope} = -.19, $p > .05$). Additionally, we found a significant negative estimate of intervention status on the slope ($B_{effect\ on\ slope}$ = -.08 , SE = .03, $\beta_{effect\ on\ slope}$ = -.21, $p < .05$, d = .28) and on the intercept ($B_{effect\ on\ intercept}$ = -.21, SE = .08, $\beta_{effect\ on\ intercept}$ = -.21, $p < .01$, d = .36). These results indicate that compared with the control group children, children in the intervention condition showed a larger decrease in EPB (Playing-2-gether effect on slope) which resulted in a significant reduction of externalizing problem behaviour for children in the intervention condition after the intervention (Playing-2-gether effect on intercept).

Discussion

Playing-2-gether is a 12-week school-based intervention targeting teacher-child interactions to reduce child EPB. In this study, we used a randomized controlled trial to examine the effect of Playing-2-gether for decreasing child EPB for children with relatively high levels of EPB. As such, this study has sought to contribute to the growing evidence-base for school-based interventions targeting EPB (e.g., Wilson & Lipsey, 2007; Wilson et al., 2003).

The Effect of Playing-2-gether on Child Externalizing Problem Behavior

The study provides support for positive effects of Playing-2-gether in reducing (teacher-rated) child EPB for children with relatively high levels of EPB. Intervention children showed a significantly larger decrease in teacher-reported EPB compared with control group children (Playing-2-gether effect on slope), resulting in a significantly lower level of EPB at Wave 3 (Playing-2-gether effect on intercept). As such, these results are consistent with the results of earlier small-scaled studies targeting teacher-child interactions to reduce child EPB (e.g., Filcheck et al., 2004; Lyon et al., 2009; McIntosh et al., 2000; Tiano & McNeil, 2006). They also suggest the importance of teacher-child interactions, next to

parent-child and peer interactions, in shaping children's behavioural development (e.g., Pianta et al., 2003). Although the effect sizes were small in the present study, they are consistent with the effect sizes of other indicated interventions targeting child EPB (e.g., Wilson et al., 2003; Wilson & Lipsey, 2007).

Moreover, the first part of the Playing-2-gether intervention in itself yielded a decrease in child EPB. As such, this study replicates and extends findings of the attachment-based, relationship-focused 'Banking Time' intervention on which the first part of the Playing-2-gether intervention was built (e.g., Driscoll & Pianta, 2010; Driscoll et al., 2011). To investigate both unique and combined effects of each of the intervention components, future research with alternated order of the intervention parts is recommended.

As Playing-2-gether was shown to reduce (teacher-rated) child EPB, this study also adds to the growing evidence for dyadic school-based interventions in changing child outcomes (e.g., Driscoll & Pianta, 2010; Driscoll et al., 2011; McIntosh et al., 2000; Spilt, Koomen, Thijs, & van der Leij, 2012). In this way, this study may help build teacher support for this approach as teachers sometimes lack willingness to invest in interventions that are focused on a single child (e.g., they find it too much time and effort to invest in one child; (Hughes, 2012). Future research may enhance this teacher support by investigating the generalization of the dyadic intervention effects to other children in the classroom and by examining the added value of a dyadic intervention approach above and beyond classroom-level interventions (Hughes, 2012).

Limitations

Despite their strengths, the findings of this study should be interpreted in the light of a number of limitations. A first limitation concerns the potentially limited generalizability of the findings due to sample selection. Although we intended to select children with relative high levels of EPB, one could argue that both Playing-2-gether and control children received, on

average, low absolute scores on the EPB screening instrument. However, Spilt and colleagues (2012) found that the median score of EPB, measured by the adapted version of the PBQ in a large randomly-selected sample of kindergartners, was very low (1.33 on a 4-point scale). In comparison with the sample of Spilt and colleagues (2012), our sample thus consists of children with, on average, above-median scores. Moreover, for this study, we only selected male preschoolers. Future research should investigate whether these findings also hold for female preschoolers, as, on average, they tend to exhibit lower levels of EPB (e.g., Dishion et al., 1995; Hagekull & Hammarberg, 2004; Rutter et al., 2003). Research does point to sex differences in the effect of interventions targeting child EPB (e.g., Kellam, Reid, & Balster, 2008).

A second limitation of this research is that teachers were the only evaluators of the intervention effect on child behaviour. This is a difficult design challenge in school mental health research because teachers are often in the best role to provide the intervention and assess the participants, especially for young children. To obtain more robust conclusions, however, more objective information concerning reductions in child EPB is recommended (e.g., behavioural observations). As such, multi-informant studies with multiple measurement occasions are recommended for future research (e.g., Doumen et al., 2012; Pianta et al., 2003). On the other hand, finding an effect on teachers' perceptions of EPB is valuable in its own, as teachers' perceptions have been shown to be predictive of school-related outcomes (e.g., behavioural engagement, school trajectories), above and beyond objective test results or observations (e.g., Doumen et al., 2012, Pianta et al., 1995). Moreover, teacher reports are low-cost, easily administrable and valid instruments that enabled us to get a first indication of the Playing-2-gether intervention effect which had not been evaluated before.

A third limitation is that only short-term effects of Playing-2-gether are evaluated in this study. Follow-up research would also enable us to investigate whether the intervention

effect is maintained in the long term (e.g., Barnett, 2011; Flay et al., 2005) and whether sleeper effects of the intervention can be found (i.e., delayed effects of the intervention later in life; Barnett, 2011).

Future Directions

Taken together, these results both replicate and extend the findings of previous studies investigating the effect of interventions targeting teacher-child interactions on child EPB. As this is the first study on the Playing-2-gether program, future research should also evaluate the (short- and long-term) intervention effects on more objective measures of child behaviour and on other (teacher, child, teacher-child interaction) outcome variables in different populations.

Moreover, future research could also investigate mediating mechanisms in the effect of the intervention on EPB . Referring to the theoretical foundations of the intervention, we suggest to investigate relationship-focused mediators, such as ‘sensitive responsiveness’ (Erickson, Sroufe, & Egeland, 1985), ‘having the child in mind’ (e.g., Fonagy, Gergely, & Target, 2007) and ‘empathy’ (Sterkenburg, Janssen, & Schuengel, 2008), as well as behavioural mediators, such as teacher behavioural management (e.g., Hagekull & Hammarberg, 2004; Rydell & Henricsson, 2004).

Conclusion

Despite its limitations, this study provides new and valuable insights into the effect of a dyadic, attachment-, and learning theory-based intervention targeting teacher-child interactions on (teacher-rated) child EPB. In this way, our results contribute to the evidence-based literature concerning school-based interventions aimed to prevent child EPB. As early EPB is an important risk factor for maladjustment in several domains later in life, including school failure and mental disorders (e.g., Dodge et al., 2006), being able to buffer the further development of EPB by a school-based intervention may have important educational and mental health implications in the long run.

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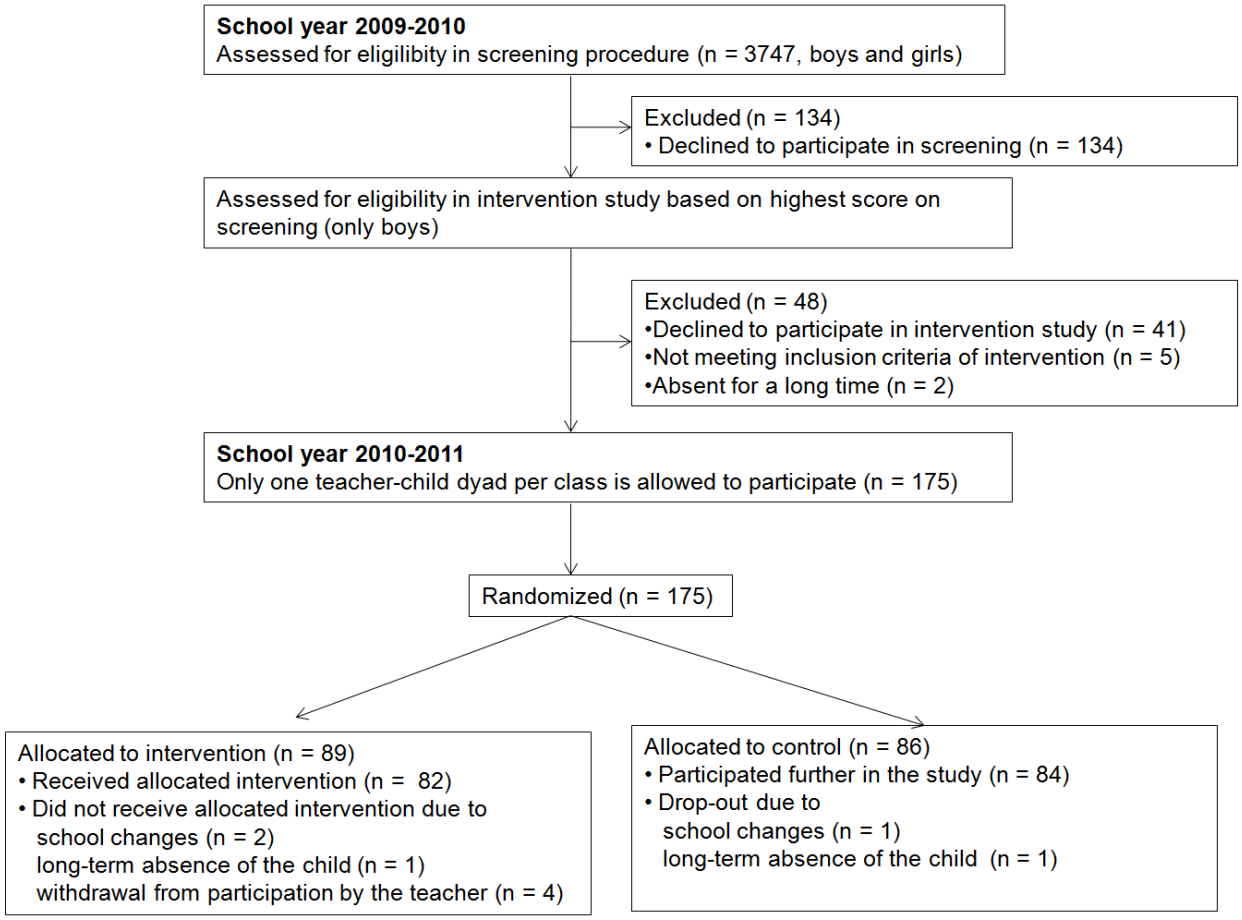

Figure 1. Flowchart of classes and participants in the randomized controlled trial.

Table 1

Means, Standard Deviations and Bivariate Correlations of Externalizing Problem Behavior

Variable	Condition							Correlations for the whole sample		
	Control		Intervention							
	M	*SD*	*M*	*SD*	*F* test	Effect size	95% CI	1	2	3
1. EPB1	1.96	0.63	1.92	0.54	0.18	0.07	[-0.07, 0.18]	-		
2. EPB2	1.99	0.63	1.78	0.56	4.89*	0.35	[0.21, 0.47]	.75**	-	
3. EPB3	1.87	0.52	1.67	0.46	6.15*	0.40	[0.29, 0.51]	.71**	.77**	-
N								172	165	153

Note. *EPB* = Externalizing Problem Behavior at Waves 1, 2, and 3 (EPB1, EPB2, EPB3). *Effect size* = Cohen's *d* (1992), *CI* = Confidence interval of effect size. The variation in sample size is due to drop-out and missings at the different measurement waves.
*p<.05. **p<.01. ***p<.001.